(7 pages) Reg. No. : .....

Code No. : 20321 E Sub. Code : CMCH 41

B.Sc. (CBCS) DEGREE EXAMINATION,
APRIL 2025.

Fourth Semester

Chemistry — Core

INORGANIC CHEMISTRY — II

(For those who joined in July 2021 and 2022 only)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The aprotic solvent is _____.
   (a) Water
   (b) Hydrogen chloride
   (c) Hydrogen fluoride
   (d) Dimethyl formamidde

2. Which of the following is a soft acid?
   (a) B_e^{2+} (b) M_g^{2+}
   (c) Ca^{2+} (d) Cd^{2+}

3. All the transition elements are _____.
   (a) metals (b) nonmetals
   (c) not malleable (d) non-ductile

4. The melting points of most of the transition elements (except Cd and Hg) are above _____.
   (a) 800°C (b) 900°C
   (c) 700°C (d) 1000°C

5. Van-Arkel de Boer process is used for the purification of _____.
   (a) Mo (b) Pt
   (c) Ti (d) V

6. Baddeleyite is an ore of _____.
   (a) Zirconium (b) Molybdenum
   (c) Cobalt (d) Titanium

7. The shape of XeF_4 is _____.

(a) Square planar

(b) Tetrahedral

(c) Octahedral

(d) Linear

8. The hybridization of Iodine in ICl_3 is _____.

(a) SP^3 (b) SP

(c) SP^3d (d) SP^2

9. The difference between the maximum and minimum value of a set is called _____.

(a) deviation (b) error

(c) range (d) mean

10. A test to compare the precision of two sets of data is _____.

(a) t-test (b) F-test

(c) Q-test (d) None of these

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain the Bronsted-Lowry concept of acids and bases.

Or

(b) Discuss the merits and demerits of hydrogen fluoride as a non-aqueous solvent.

12. (a) Write a short notes on the oxidation state of d-block elements.

Or

(b) Explain the following for the d-block elements (i) size (ii) density.

13. (a) Explain the process of roasting of an ore.

Or

(b) How is Zirconium extracted from its ore?

14. (a) Explain the preparation and structure of IF_7.

Or

(b) Write short notes on Pseudohalogens.

15. (a) Explain F-test.

Or

(b) Find out the significant figures for the following

(i) 33.3

(ii) 0.0321

(iii) 3.3×10^{-4}

(iv) 0.4201

(v) 32.253

PART C — ($5 \times 8 = 40$ marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) (i) What are hard acids and soft acids?

(ii) What are the limitations of hard and soft acids and bases?

Or

(b) Define the following with examples.

(i) Lewis acid

(ii) Lewis base

(iii) Protic solvents

(iv) Aprotic solvents

17. (a) Give an account of Lanthanide contraction and its consequences.

Or

(b) Explain the following for the d-block elements.

(i) Metallic character

(ii) Colour and

(iii) Catalytic properties.

18. (a) Discuss on the following :

(i) Froth-Floatation process

(ii) Gravity separation.

Or

(b) Give any three uses of the following metals.

(i) Cr

(ii) Mn

(iii) Zr.

19. (a) Write any two preparation for the following compounds.

(i) CIF

(ii) ICl_3

(iii) BrF_5.

Or

(b) Give an account of Clathrates.

20. (a) Write brief account on the classification of errors.

Or

(b) Explain the concept of method of least squares. How is a best graph drawn by this principle?
